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(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

5873US.04

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

Not Yet Assigned

09/980527

INTERNATIONAL APPLICATION NO.  
PCT/EP99/02774INTERNATIONAL FILING DATE  
23 April 1999PRIORITY DATE CLAIMED  
23 April 1999

## TITLE OF INVENTION

METHOD OF WRAPPING A ROUND BALE COMPACTED BY A ROUND BALER, FILM-WRAPPING DEVICE  
AND ROUND BALER THAT IS PROVIDED WITH SUCH A FILM-WRAPPING DEVICE

## APPLICANT(S) FOR DO/EO/US

RAMPP, Erwin

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☐ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

## Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☒ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☐ Other items or information:

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53) Not Yet Assigned	INTERNATIONAL APPLICATION NO. PCT/EP99/02774	ATTORNEY'S DOCKET NUMBER 5873US.04
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24. The following fees are submitted:

**BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :**

<input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO .....	\$1040.00
<input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....	\$890.00
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....	\$740.00
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) .....	\$710.00
<input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) .....	\$100.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =**

\$890.00
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Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

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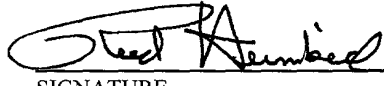
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	26 - 20 =	6	x \$18.00
Independent claims	5 - 3 =	2	x \$84.00
Multiple Dependent Claims (check if applicable)			<input type="checkbox"/> \$0.00
<b>TOTAL OF ABOVE CALCULATIONS =</b>			\$1,166.00
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.			\$583.00
<b>SUBTOTAL =</b>			\$583.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).			\$0.00
<b>TOTAL NATIONAL FEE =</b>			\$583.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).			<input type="checkbox"/> \$0.00
<b>TOTAL FEES ENCLOSED =</b>			\$583.00
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- a. ☒ A check in the amount of \$583.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-1415. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Reed R. Heimbecher, Esq.  
Customer No. 20686

  
SIGNATURE

Reed R. Heimbecher

NAME

36,353

REGISTRATION NUMBER

18 October 2001

DATE

PTO/PCT Rec'd 15 FEB 2002

09/980527  
Express Mail No. EL 759299972 US  
Attorney Docket No. 5873US.04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Erwin Rampp

Serial No.: Not Assigned

Group Art Unit: 3721

International App. No.: PCT/EP99/02774

Examiner: Not Assigned

Filed: 18 October 2001

For: METHOD OF WRAPPING A ROUND BALE COMPACTED BY A ROUND  
BALER, FILM-WRAPPING DEVICE AND ROUND BALER THAT IS  
PROVIDED WITH SUCH A FILM-WRAPPING DEVICE

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PRELIMINARY AMENDMENT

BOX NON-FEE AMENDMENT

Commissioner for Patents  
Washington, D.C. 20231

Sir:

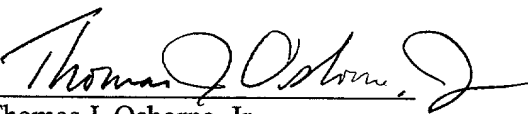
Please amend the specification to insert in the first line,

-- This application claims priority to and incorporates by reference in its entirety PCT International Application No. PCT/EP99/02774 entitled METHOD OF WRAPPING A ROUND BALE COMPACTED BY A ROUND BALER, FILM-WRAPPING DEVICE AND ROUND BALER THAT IS PROVIDED WITH SUCH A FILM WRAPPING DEVICE filed on 23 April 1999 by Erwin Rampp, which application was published in the German language. --

Applicant's attorney believes no fee is due. However, in the event that a fee is determined to be due, the Commissioner is hereby authorized to charge Deposit Account No. 04-1415 for any filing fees required under 37 C.F.R. 1.16 and 1.17.

Signed at Denver, Colorado, this 15<sup>th</sup> day of February, 2002.

Respectfully submitted,



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PCT

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INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE  
INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

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A01F 15/07

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(81) Bestimmungsstaaten: AU, JP, KR, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Veröffentlicht

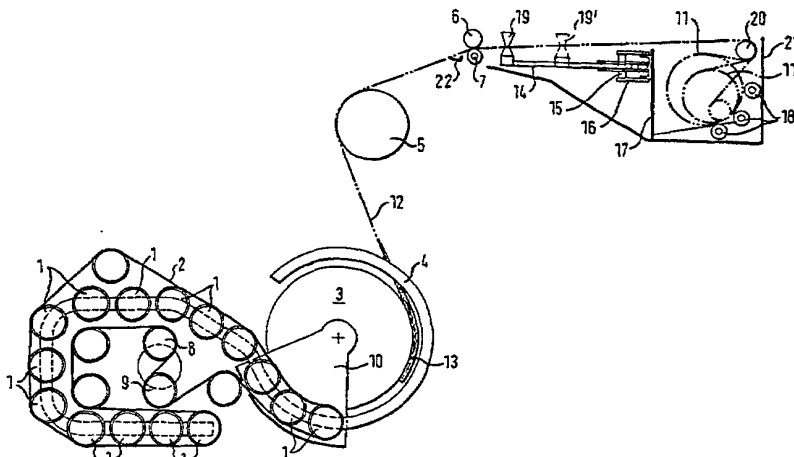
Mit internationalem Recherchenbericht.

(54) Title: METHOD OF WRAPPING A ROUND BALE COMPACTED BY A ROUND-BALER, FILM-WRAPPING DEVICE AND ROUND-BALER THAT IS PROVIDED WITH SUCH A FILM-WRAPPING DEVICE

(54) Bezeichnung: VERFAHREN ZUM WICKELN EINES IN EINER RUNDBALLENPRESSE GEPRESSTEN RUNDBALLENS, FOLIENUMWICKELUNGSVORRICHTUNG UND RUNDBALLENPRESSE MIT EINER SOLCHEN FOLIENUMWICKELUNGSVORRICHTUNG

(57) Abstract

The invention relates to a method and to a device for wrapping an adhesive film (12) that has at least one adhesive side around at least the cylinder-shaped surface area of a round bale that has been compacted by a round baler. According to the inventive method, the film (12) is pulled off from a film dispenser (11) across its entire width by means of a pull-off device (6, 7). During a predetermined period of the pull-off operation, a film strip (13) is formed from the film (12). The film strip (13) is introduced into the gap between the round bale (3) to be wrapped and a device that defines the peripheral wall (2) of the baler chamber. When the round bale (3) is set into rotation, the film strip (13) that is located in the gap is locked in. The round bale (3) is rotated until the desired number of film layers is formed on the surface area of the round bale.



Method for wrapping a round bale pressed in a round bale press,film wrapping device and round bale pressincluding a film wrapping device of this kind**Technical field**

5 The invention relates to a method for wrapping a round bale pressed in a round bale press about at least its essentially cylindrical surface area with an at least unilaterally adhesive film. The invention further relates to a film wrapping device for round bales pressed in a round bale press, in particular round bales comprising garbage, as well as a round bale press including a film wrapping device of this kind.

**Prior art**

10 Round bale presses have been known for some time for pressing straw, hay or other agricultural halm and blade material. Thus, a bale rolling press for agricultural halm and blade materials is disclosed in the publication DE 34 26 965 C2, the press chamber thereof being delimited by a plurality of circularly arranged conveyor rollers receiving the harvest material which has been received by a pick-up drum. A very similar round bale press is known from EP 0 131 397 A2.

15 For almost ten years now it has been known to pack garbage, in particular household garbage, industrial garbage, etc., using a round bale press. By using a round bale press, air inclusions present in the garbage are pressed out from the garbage bale by continuously revolving the garbage that is being progressively filled into the press chamber of the round bale press. Thus, there does not ensue any compression of the  
20 enclosed air, rather, the air inclusions are mostly displaced towards the edge areas of the bale or are completely ousted from the formed round bale. After the pressing of the garbage bale, the pressed garbage round bale is completely wrapped with a film. By means of this complete wrapping, the normally occurring rotting process is stopped. Consequently, by means of film packings of this kind, it becomes possible  
25 to store garbage for a longer period of time without bad smells or gas development arising. To produce round bales from garbage has moreover the advantage that an intermediate storage is possible in a storage area without requiring any further

preliminary arrangements. The pressing of garbage into round bales has been disclosed for the first time in the document DE 39 41 727 A1. Modified round bale presses for pressing garbage are, for example, known from DE 195 36 750 A1 and WO 95/00324. The document EP 0 004 314 B1 has still to be mentioned, wherein a  
5 bale pressing device for cardboard waste material is described, which, it is true, is only intended for being used for smaller cardboard round bales, wherein, however, also round bales are formed in principle, which are no longer wrapped with film. The press chamber here is formed by two revolving endless conveyor belts.

All of the above-mentioned round bale presses, as well as those presses which are  
10 explicitly destined for pressing garbage, as well as agricultural halm and blade materials, are provided for stabilization and shape-keeping reasons with a net-wrapping or yarn-wrapping means, with which the pressed round bale is wrapped on its surface area with a net web or a yarn. The complete wrapping with film only ensues in all cases in a film wrapping device arranged downstream, in which the bale  
15 is completely wrapped with films on its front ends and on the surface area.

Since the complete wrapping of the bale only ensues in a downstream film wrapping device, the bale of the devices known from prior art has to be kept together in a stable shape by the net web or the yarn at least on its circumference (on the surface area) for being transported between the round bale press and the film wrapping device. Thus, a  
20 net tissue web for covering round balls of this kind is known from DE 36 12 223 A1.

In summary, it has hence to be stated that the actually known pressed round bales are always wrapped with a net web or a yarn on their circumferential bale area or surface area, prior to being completely wrapped with a film. This proceeding exhibits several disadvantages. Thus, several packing materials have to be kept stored in a packing  
25 plant. Moreover, in the case of the wrapping of the pressed round bale with a net web or a yarn on its surface area, the risk of looser components of the pressed bale falling out through the net or the yarn during transportation from the round bale press to the downstream film wrapping device is rather high, a fact which can lead to a dirt accumulation in the plant and, in the worst case, to functional failure of the individual

contrivances present therein. For a tight wrapping of the entire round bale with film, the film overlapping has to be conceived relatively large, whereby in the actually used film wrapping method – which will be explained in detail in the following – thick film accumulation arise at the front ends of the round bale. The film wrapping of the  
5 entire round bale ensues in such a way that the pressed round bale lying on a wrapping table is uniformly rotated about its symmetry axis, while either a film roll rotates about a vertical axis about the round bale, or, in case of a stationary film roll, the round bale is in addition rotated about its vertical axis. Caused by the inevitably necessary large film overlapping for achieving a tight packing, the film consumption  
10 per bale is relatively high. Therewith, however, the packing costs per finished round bale are high, as well.

### **Representation of the invention**

The technical problem on which the invention is based consists in realizing a method, by means of which the aforementioned disadvantages are at least in part eliminated. The invention is further based on the technical problem of providing a device for  
15 realizing a method improved in this way.

These technical problems on which the invention is based are solved by a method according to claim 1, by a device having the features of claim 14, and by a round bale press having the features of claim 26.

The inventive method is characterized in that during the unwinding of a film web  
20 from a film roll, a film rope is formed from the wide film web over the entire width during a predetermined period of time by means of a pulling-off means, said film rope being advantageously gathered up in its width. Under film rope, here, a film portion has to be understood in a general manner, which has in some way been formed from the present film web and which exhibits a higher flexural rigidity. Thereby, the  
25 normally present adhesiveness of the film is optionally used. It has, however, to be emphasized, that if the case may be, a non-adhesive film can be used, as well, which prior to the forming of the film rope, is modified by acting upon the film material



(heat treatment, application of a chemical substance, application of an adhesive, etc.)  
in a way that joined film parts adhere to one another.

At the forming of this film rope of higher rigidity extending over a partial section of the film web length, i.e. over a determined length of the film web, it is possible for the first time to use a film as an enveloping material for a pressed round bale instead of the previous net or yarn web. By means of the rope formation, the film can be introduced into the gap between the pressed round bales and the circumferential press wall formed by any device. By then rotating the bales again in the press, the film is wrapped over the bale surface area with engagement and carriage of the film rope, and namely in the full width of the film web, such as it was hitherto already realized with the net web. By forming a single layer or a multilayer on the circumferential bale wall, a sufficient stability of shape and strength for the further transportation of the bale to the film wrapping device is given, wherein the prepared bale is completely wrapped with film. All hitherto made attempts to replace the previously necessary net web with film, were insofar unsuccessful due to the at least unilaterally adhesive film, said very thin film could not be applied without great effort, in particular not automatically, to the circumferential bale wall. With a pulling-off means comprising two rollers arranged forming a gap between the rollers for the passage of the film length, one of said rollers being driven, it particularly caused the at least unilaterally adhesive film to adhere to one of the rollers, thus preventing the film from being further pulled off from the film roll, and in particular from being applied to the bale surface area.

This hitherto unsolved problem with affected pulling-off means having adjacent rollers for delivering the film, is solved by the inventive formation of a film rope, since the film rope of now higher-rigidity can be easily guided – in particular in the case of at least one resiliently supported roller – through the roller gap of a conventional pulling-off means, and can then be introduced automatically into the gap between the round bale and the circumferential edge of the press chamber.

By initially wrapping the bale surface area with two or more film layers, the subsequent complete wrapping can be carried out with a by far less overlapping wrapping, so that the amount of film required for a film wrapping is reduced. For this reason, the production costs for a film-wrapped round bale are distinctly lower than previously.

It is, for example, possible that only two instead of hitherto four layers of film are necessary. Moreover, the risk of damage is reduced for a completely wrapped round bale during transportation and handling of a finished wrapped bale, since the film is no pre-stressed in two directions, for one, in the circumferential direction and, for another, in 90° relative thereto. Thereby, it is possible, that a hole, involuntarily punctured through the two films during transportation, does not expand, and that actually only a small through-going hole remains. This is achieved in that the hole introduced into the film, which is pre-stressed in the circumferential direction, expands slot-shaped in the circumferential direction of the one film, and in the superposed film layer twisted by 90°, expands likewise slot-shaped by twisted by 90°. By means of the superposition of these slots staggered relative to one another by 90°, there only remains the extremely small hole, which does not cause any problems. Moreover, it has to be stated that the bales inventively wrapped in a novel manner become tighter at their circumferential or surface area by the finally resulting "cross adhesion bond". Thereby, the bale content is better protected against penetrating rain water or against short water accumulations on the bale storage ground in case of temporary flooding when used in agriculture.

Finally, it is to be stated that, as it is usual to date, round bales of dry hay or straw are only net-wrapped and not completely film-wrapped. In this case, however, the inventive film wrapping on the surface area instead of the net without covering the front ends, is of an important advantage for durability in an open storage. This means that rain water would not only flow off from the surface area by the existing compression of the halm-shaped material, but would also be prevented from penetration for the first by the film applied to the surface area. Thereby, it is of

course optimal that the film webs are wider than the wrapped round bale, so that the projecting film edges can serve as a "roof".

According to the invention, the films hitherto used in this field can also be used for the wrapping of surface areas of round bales. Therewith, it is only necessary to keep  
5 one film type in storage. Moreover, it is possible according to the invention, to use films having a thickness of only 10-20  $\mu\text{m}$ , in particular 15-18  $\mu\text{m}$ . To date, film thicknesses of 25  $\mu\text{m}$  were usually employed in agriculture, said film thicknesses having even been increased to 30  $\mu\text{m}$  so as to achieve at least a better rigidity. These films, however, due to their important thicknesses, are in turn more expensive and  
10 heavier.

As can be seen from the above statements, the invention may not only be used for round bales of garbage but also for agricultural halm and blade materials. Moreover, animal food, for example, which is compressible and compactable by rotary compression, can be packed correspondingly.

15 The formation of the film rope advantageously ensues by gathering up the film in its width. By means of the film's (unilateral or bilateral) adhesiveness or its capacity for adhering, a film rope of higher rigidity is formed by pushing the film edges together, said film rope exhibiting the aforementioned advantages. Alternatively thereto, a torsion or twisting of the film about a longitudinal axis of the film web is also possible  
20 for forming the film rope. From the constructional point of view, however, the realization of this method is more complicated.

In an optimum manner, a film rope is formed for the periodic wrapping of the film about the bale surface area shortly before finishing the last film layer, and the film web is then cut off in front of the film rope. Therewith, the necessary prerequisites  
25 are created for wrapping a subsequent pressed round bale again on its surface area with one or more layers of a film, in particular with two layers.

It is extremely advantageous that after the wrapping of the bale on its surface area, a wrapping ensues over the front ends with the same film length, so that the bale is completely packed as a whole.

As in case of the hitherto usual round bale presses, however, the subsequent complete wrapping can also be carried out in a downstream film wrapping device, for which reason the film-stabilized round bale is outputted from the round bale press and transferred to a wrapping table, on which the round bale is then completely wrapped with film in the conventional manner. This wrapping table is thereby in particular realized according to prior art, such as it is, for example, disclosed in DE 195 42 645 A1.

The hitherto used films are employed as films. In particular, an elastic PE film can be used. Particularly good properties are also exhibited by the so-called LLDPE films provided with an adhesive layer on the inner side. As already outlined before, a film can also be used which only becomes adhesive under certain conditions such as, for example, a heat treatment.

An inventive film wrapping device for round bales pressed in a round bale press features a film roll holding device associated with a pulling-off device for pulling off the film from the film roll. Moreover, a film rope forming device is present by means of which a film rope can be realized in the pulled off film web over a certain film web length. For cutting the foil off, a cutting means is arranged downstream of the pulling-off device.

A technically very simple and cost-efficient solution for a film roll holding device consists of a receptacle box for receiving the film roll, comprising an outlet opening for the film on one side, the opening being approximately adapted to the film width. Therewith, complicated and expensive supports are not required.

So as to reduce friction of the film roll within the receptacle box, several rotatably mounted supporting rolls are present within the receptacle box, with the rotation axes thereof being parallel to the longitudinal axis of the film roll.

Alternatively thereto, a film roll holding device is imaginable comprising a fastening device holding the film roll at its front side.

Alike the hitherto known net wrapping devices, the pulling-off device advantageously comprises at least two rollers between which the film is to be guided through, and at least one of them being driven.

For enabling the formed film rope to pass through the roller gap of the two rollers opposed to one another, at least one roller of the roller pair is non-rigidly (e.g. resiliently) mounted.

The film rope forming means according to an advantageous embodiment comprises a film rope constriction means bilaterally engaging the film edges and being variable in their mutual spacing. Thereby, the wide film rope is gathered up to a smaller width, and a film rope of higher rigidity is formed, which for the first time can be introduced between the round bale and the circumferential press chamber wall without further auxiliary means.

A technically simple and again cost-efficient solution for a film rope constriction means comprises two or more pivotably mounted pivot arms equipped with rolls, which can be brought into engagement with the edges of the film web.

Since the pivot arms are mechanically coupled by a lever system, only one drive means is necessary for pivoting the plurality of pivot arms. Alternatively thereto, it is of course also possible to pivot each single pivot arm by a (pneumatic or hydraulic) control cylinder. Moreover, a drive by an electromotor is also imaginable. In inventive film wrapping device preferably comprises a control means controlling the film rope forming device and the cutting means in such a coordinate manner that shortly before the desired number of film layers will be wrapped around the surface area of the round bale, said film rope forming device will be activated over a certain space of time so that a film rope comprising again a predetermined length will be formed. After the formation of the film rope, the cutting means is then activated so

that the film, seen in the pulling off direction of the film, is cut in front of the film rope.

A film wrapping device according to the invention is already advantageously integrated into a round bale press such as it is used in the state of the art for pressing agricultural harvest products or halm and blade material, or for pressing of garbage, instead of the previous net or yarn wrapping device. It is, however, also possible to subsequently install without any difficulties, such an inventive film wrapping device into an existing round bale press of the aforementioned kind to substitute the existing net or yarn wrapping devices. Such retrofit works are possible without major expenditure. Therewith, it is in particular possible to reduce the production costs per bale even in existing round bale presses.

#### **Short description of the drawings**

For further explanation and for a better understanding, an exemplary embodiment of the invention will be described in the following with reference to the attached drawings. Therein shows.

- Fig. 1 a schematic side view of a film wrapping device of a round bale press,
- Fig. 2 a top view of the film wrapping device as per Fig. 1,
- Figs. 3a-3c a schematic perspective view of various method steps for forming a film rope in a film web, and the guidance of same towards a pressed round bale, which, however, is not fixed on its circumferential side.

#### **Description of a preferred embodiment of the invention**

- In the schematic side view as per Fig. 1, a round bale press is shown comprising a number of supporting rolls 1 displaceable along a crank guide 4. Through a crank displacement means 10, the supporting rolls 1 are essentially arranged on a full circle, so that a cylindrical round bale press chamber arises. The supporting rolls 1 support an endless belt 2 forming the circumferential wall of the press chamber. By means of tension rollers 8, 9, the tension of the endless belt 2 is adjusted in the desired manner.

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Above the round bale press, which in this way corresponds to prior art, a film wrapping device according to the invention is arranged. Said film wrapping device comprises a receptacle box 21, in which a plurality of supporting rolls 18 are rotatably arranged. Said supporting rolls 18 are parallel to one another with their rotational  
5 axes and serve for supporting a film roll 11 present in the receptacle box. Reference numeral 11' designates a film roll having a reduced diameter due to film consumption. Two holding devices 16 are attached spaced apart from each other on a side wall 17 of the receptacle box 21. Said spacing is at least larger than the film web width of the film web 12 which is being pulled off from the film roll 11. A pintail 15  
10 is rotatably mounted in the respective holding device 16, on which pintail 15, in each case a pivot arm 14 is pivotably mounted. On the front end of said pivot arm, film edge constriction means 19 are in each case arranged, the rotational axes thereof being essentially perpendicular to the longitudinal direction of the film web.

In front of the film wrapping device including the pivot arms 14, a film pulling-off  
15 device is arranged in the form of two opposing rollers 6, 7, roller 7 being driven. Roller 6 is resiliently mounted with respect to roller 7, so that depending on the thickness of the film, the roller gap between the roller 6, 7 automatically adjusts in the manner required for allowing the film or the thicker and more rigid film rope to pass through. Both rollers 6, 7 are provided with a friction-increasing lining, e.g. a rubber  
20 lining.

In front of said film pulling-off device, a cutting means 22 is present by means of which the film web 12 can be cut transversely to its extension direction.

In front of said cutting means 22, a deflection of roller 5 is arranged, by means of which the film is deflected into the press chamber of the round bale press. The  
25 representation of Fig. 1 is only schematic here, and does, for one, not reflect the correct dimensional relationships and, for another, does not reflect either the spatial arrangements of the deflection roller of the round bale press corresponding to the actual conditions.

In Fig. 2, the film wrapping device having two pivotably mounted pivot arms 14 can be seen in the greater detail. Thus, levers 30 are fixed at the ends of the pivot arms 14, opposite the rolls 19, which are coupled with one another via a connecting rod 31. Said connecting rod 31 is thereby articulated in the levers 30 by means of link joints 32. By means of this configuration, a single drive of one pivot arm allows to correspondingly pivot the second pivot arm 14 in a mirror-inverted manner, so that the spacing between said rolls 19 can be reduced in the desired manner.

The inventive method will now be described in particular with reference to Figs. 3a-3c. In a round bale press as per Fig. 1, a round bale 3 is produced in the conventional manner. After the film has been guided once through between the rollers 6, 7, it will adhere to the round bale 3 due to its adhesive inner side, and will be carried along through rotation of the round bale 3 by means of the endless belt 2.

Shortly before the desired number of film layers is reached, the pivot arms 14 are inwardly pivoted, so that the rolls 19' bring together the film web edges of film web 15, and the film web in between is gathered up, whereby with further pulling off the film, a film rope 13 having higher rigidity arises over a certain film web length. Said film rope 13 is guided through the gap of the rollers 6, 7, and is then cut off by means of the cutting device 22. The finished wrapped round bale 3 is guided out from the press, and the production of a new round bale 3' starts, such as it is shown in Fig. 3c. As soon as the round bale 3' is completely pressed, the film rope is guided through the rollers 6, 7 between the round bales 3' and the endless belt 2, and by driving the endless belt 2, the film is carried along, so that after the pivot arms 14 have opened, the film web 12 gets in contact in its full width with the circumferential side of the round bale again. As soon as the desired layer number is reached on round bale 3' again, there ensues anew the formation of a film rope.

It has still to be noted that a deflection roll 5 is not imperative, and is not present in a preferred embodiment, so that the entire net wrapping device can be arranged very closely to the press chamber. Thereby, it is secured that the film rope 13 is always carried along by the bale.



## Claims

1. Method for wrapping a round bale (3) pressed in a round bale press about at least its cylindrical surface area with an at least unilaterally adhesive film (12), wherein

5 a) the film (12) is pulled off from a film roll (11) in its entire width by means of a pulling-off device (6, 7),

b) a film rope (13) is formed from the film (12) during a predetermined space of time of the pulling-off operation according to step a),

10 c) the film rope (13) is introduced into the gap between the round bales (3) to be wrapped and a device (2) forming the circumferential press chamber wall,

d) the round bale (3) is hereafter set into rotation, so that the film rope (13) present in the gap is carried along, and

e) the round bale (3) continues to rotate until the desired number of film layers have formed on the surface area of the round bale.

15 2. Method according to claim 1,

characterized in that the film rope (13) is formed by gathering up the film (12) in its width.

3. Method according to claim 1,

20 characterized in that the film rope (13) is formed by twisting the film (12).

4. Method according to claim 1,

characterized in that shortly before the desired number of film layers have been wrapped on the round bale (3), another film rope (13) will be formed.

5. Method according to claim 4,

5 characterized in that the film (12), seen in the pulling-off direction, is cut in front of the film rope (3).

6. Method according to claim 1,

10 characterized in that pulling off of the film (12) from the film roll (11) ensues in the entire width thereof by guiding the film (12) through between two rollers (6, 7) exerting a mutual pressure, at least one of them being driven.

7. Method according to claim 6,

15 characterized in that the cutting off of the film (12) ensues downstream of the pulling-off device (6, 7) by means of a cutting means (22) displaceable transversely to the longitudinal direction of the film.

8. Method according to claim 1,

characterized in that after the method step e) the film is guided around the round bale with the round bale rotating, so that the entire round bale is completely enclosed by film webs overlapping one another.

20 9. Method according to claim 4,

characterized in that after the method step e) the film (12) is cut off, and the round bale (3), film-stabilized on its surface area, is outputted from the round bale press and is transferred to a wrapping table, on which the round bale (3) is completely wrapped with film.

25 10. Method according to any one of the preceding claims,

characterized in that the film (12) is an elastic PE film.

11. Method according to claim 8,

characterized in that the film (12) is a LLDPE (Linear Low Density PolyEthylene) film provided with an adhesive layer on its inner side.

5 12. Method according to claim 8,

characterized in that the film (12) consists of a material, which becomes adhesive under certain conditions.

13. Method according to any one of the preceding claims,

10 characterized in that the film (12) is wider than the surface area of the round bale (3) and is wrapped around the surface area in such a manner that it projects at the two front faces of the round bale (3) by approximately the same amount, and is put against same at its latest by means of a downstream entire bale film wrapping.

15 14. Film wrapping device for a round bale (3) pressed in a round bale press, in particular round bales including garbage, comprising

- a film roll holding device (21) for holding the film roll (11),

- a pulling-off device (6, 7) for pulling off the film from the film roll (11),

- a film rope forming device (14, 19), by means of which in the pulled off film web (12) a film rope (13) can be produced over a certain film web length, and

20 - a cutting means (22) arranged downstream of the pulling-off device (6, 7) for cutting off the film (12)

15. Film wrapping device according to claim 14,

characterized in that the film roll holding device consists of a receptacle box (21) for receiving the film roll (11), said receptacle box (21) comprising on one side an outlet for the film (12) adapted approximately to the film width.

5 16. Film wrapping device according to claim 15,

characterized in that the receptacle box (21) comprises a plurality of rotatably mounted supporting rolls (18) the rotational axes of which are in parallel to the longitudinal axis of the film roll.

17. Film wrapping device according to claim 14,

10 characterized in that the film roll holding device comprises a tensioning device holding the film roll at its front side.

18. Film wrapping device according to claim 14, characterized in that the pulling-off means comprises at least two rollers (6, 7), between which the film is to be guided through, and at least one of them being driven.

15 19. Film wrapping device according to claim 18, characterized in that at least one roller (6) of the pair of rollers (6, 7) is non-rigidly mounted, so that the other roller gap is variable.

20. Film wrapping device according to claim 14, characterized in that the film rope forming device comprises film web construction means (19)  
20 bilaterally engaging the film edges and being variable in their mutual spacing.

21. Film wrapping device according to claim 20, characterized in that the film web construction means are rolls (19) mounted on pivot arms (14).

22. Film wrapping device according to claim 21, characterized in that the pivot arms (14) are mechanically coupled by a lever system (30, 31).

23. Film wrapping device according to claim 14, characterized in that the film rope forming device comprises means causing the film (12) to twist about the longitudinal direction of the film web.

24. Film wrapping device according to claim 14, characterized in that the cutting device (22) consists of a blade extending transversely over the film web and being pivotably mounted, so that it is movable in and out of engagement with the film.

25. Film wrapping device according to claim 14, characterized in that a control means is provided, which

10 - shortly before the desired number of film layers have been wrapped around the surface area of the round bale (3), activates the film rope forming device (14, 19) over a certain space of time, so that a film rope (13) is formed comprising a predetermined length again, and

15 - then activates the cutting means (22), so that, seen in the pulling-off direction of the film, the film (12) is cut in front of the film rope (13).

26. Round bale press for pressing pressable material, in particular agricultural harvest products such as straw, hay or grass, or garbage, for example, household or industrial garbage, comprising

20 - a press chamber into which the material is to be introduced and compressed under continuous rotation, so that a round bale (3) of pressed material can be produced, and

- a film wrapping device for the round bale (3) produced in the press chamber, comprising a film roll holding device (21),

25 • a pulling-off device (6, 7) for pulling the film off (12) from the film roll (11),

- a film rope forming device (14, 19), by means of which in the pulled-off film web (12) a film rope (13) can be produced over a certain film web length, and
- a cutting means (22) arranged downstream of the pulling-off device (6, 7) for cutting off the film (12).

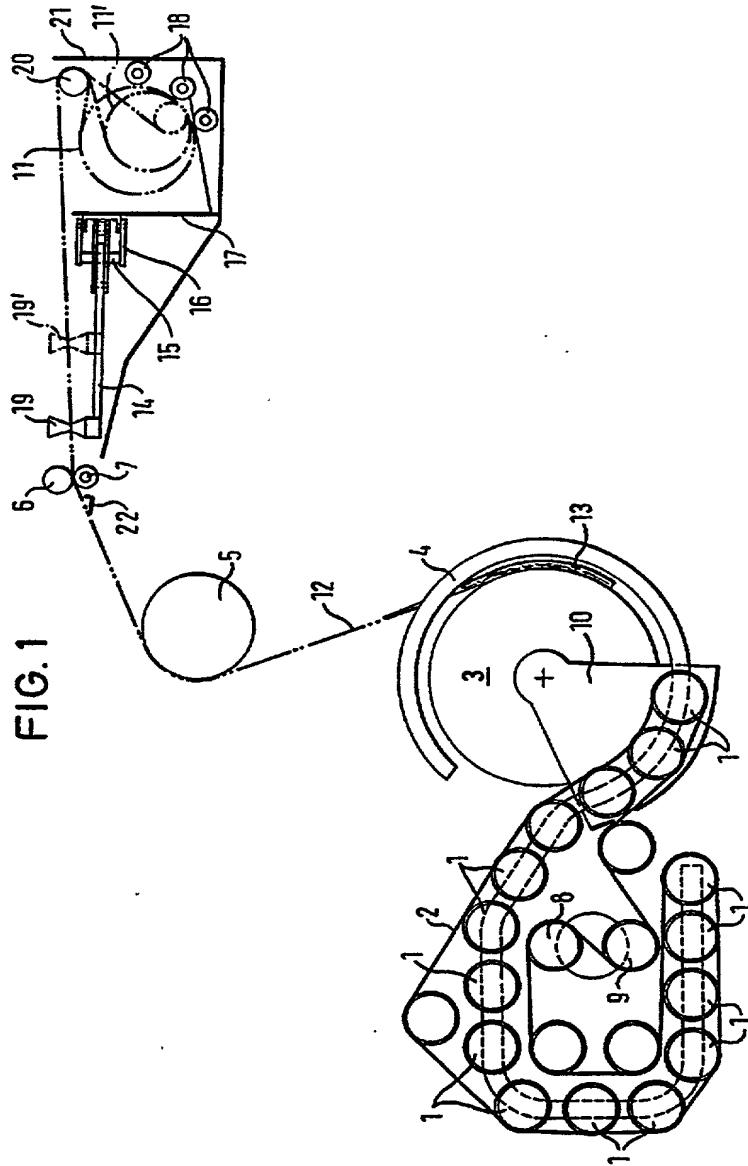
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### Abstract

The invention relates to a method and a device for wrapping a round bale pressed in a round bale press at least about its cylindrical surface area with an at least unilaterally adhesive film (12). With the inventive method, the film (12) is pulled off by means of a pulling-off device (6, 7) from a film roll (11) in its entire width. During a  
5 predetermined space or time of said pulling-off operation, a film rope (13) is formed from the film (12). Said film rope (13) is introduced into the gap between the round bales (3) to be wrapped and a device forming the circumferential press chamber wall (2). By setting the round bale (3) into rotation, the film rope (13) present in the gap is carried along. The round bale (3) is so long rotated until the desired number of film  
10 layers has formed on the surface area of the round bale.

(Fig. 1)

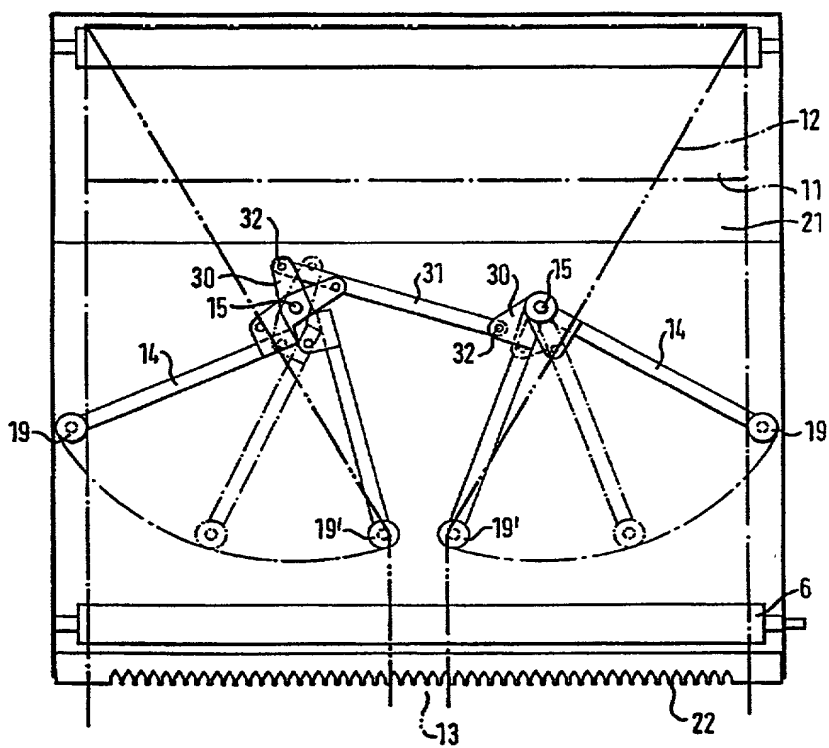
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FIG. 2



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FIG. 3a

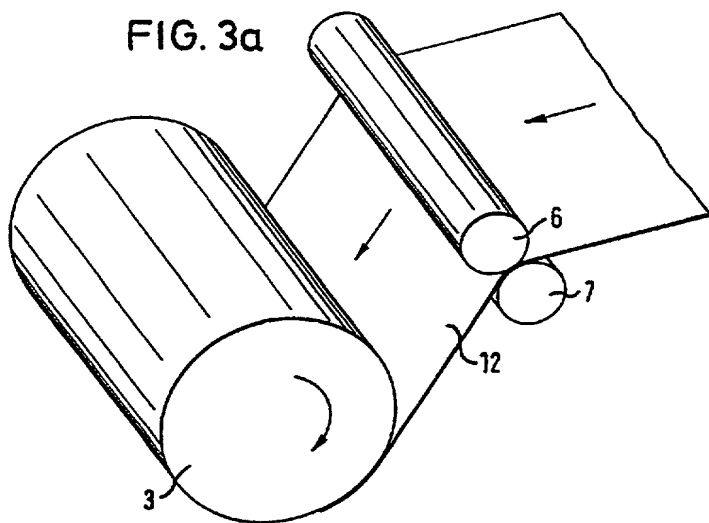


FIG. 3b

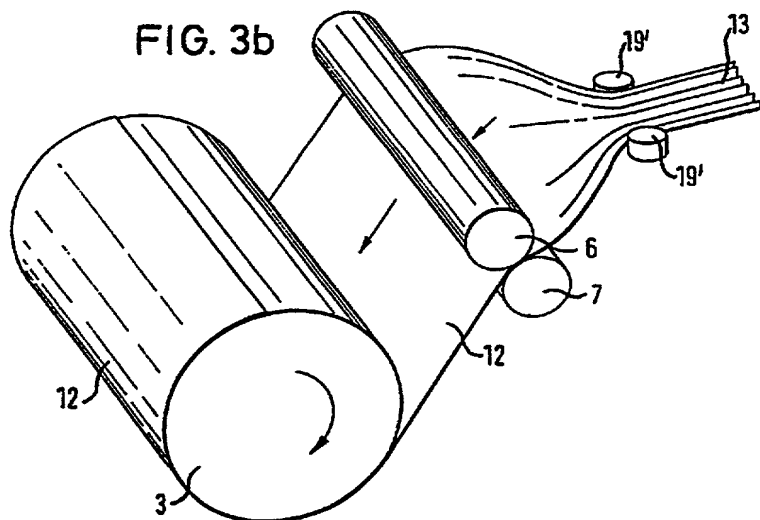
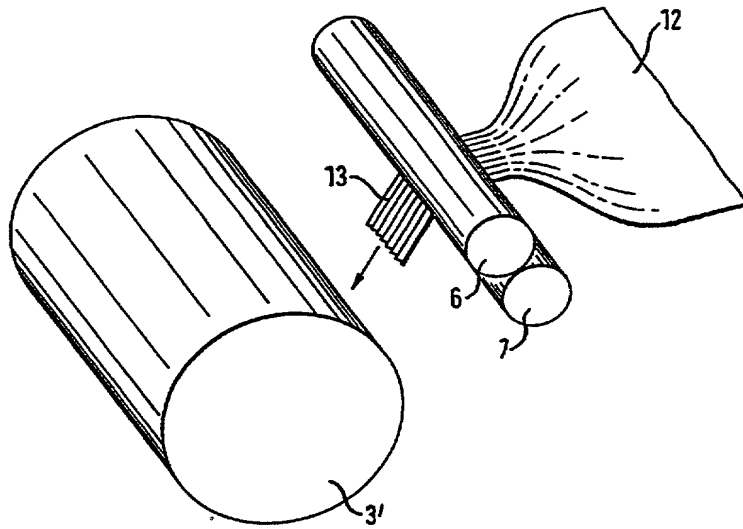


FIG. 3c



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Attorney Docket No.: 5873US.04

## Declaration For Patent Application

### English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

#### METHOD OF WRAPPING A ROUND BALE COMPACTED BY A ROUND BALER, FILM-WRAPPING DEVICE AND ROUND BALER THAT IS PROVIDED WITH SUCH A FILM-WRAPPING DEVICE

the specification of which  
(check one)

- ☐ is attached hereto.  
☒ was filed on 23 April 1999 as United States Application No. or PCT International

Application Number PCT/EP99/02774

and was amended on \_\_\_\_\_

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>
_____ (Number)	_____ (Country)	_____ (Day/Month/Year Filed)	<input type="checkbox"/>

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 Attorney Docket No.: 5873US.04

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

\_\_\_\_\_  
 (Application Serial No.) (Filing Date)

\_\_\_\_\_  
 (Application Serial No.) (Filing Date)

\_\_\_\_\_  
 (Application Serial No.) (Filing Date)

I hereby claim the benefit under 35 U.S.C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C.F.R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

\_\_\_\_\_  
 (Application Serial No.) (Filing Date) (Status)  
 (patented, pending, abandoned)

\_\_\_\_\_  
 (Application Serial No.) (Filing Date) (Status)  
 (patented, pending, abandoned)

\_\_\_\_\_  
 (Application Serial No.) (Filing Date) (Status)  
 (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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MAIWALD GMBH

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Attorney Docket No.: 5873US.04

Full name of sole or first inventor	Erwin KAMPP	10.4.02
Sole or first inventor's signature		Date
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Full name of second inventor, if any		
Second inventor's signature		Date
Residence		
Citizenship		
Post Office Address		
Citizenship		

Subscribed to and sworn to before  
me this 10 day of April, 2002.Christine Fehr

Witness

3 of 3

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